

## **REMARKS/ARGUMENTS**

The Office Action dated June 22, 2010 has been carefully considered. Claims 8 and 10-19 are pending in the application, with claims 8 and 15 being the only independent claims. Claims 8, 10, 13-16 and 19 have been amended. No new matter has been added. Support for the amendments can be found at, for example paragraphs [0068] and [0069] of the instant specification. Reconsideration of the application, as amended herein and in view of the following remarks, is respectfully requested.-

### **Claim Rejections**

#### **35 USC §112**

Claims 8 and 10-19 were rejected as under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Responsive to the rejection under 35 U.S.C. §112, Applicant respectfully submits that that the foregoing amendments to claims 8, 10, 13-16 and 19 are believed to overcome the rejection.

In view of these amendments, withdrawal of the rejection under 35 U.S.C. §112 is respectfully requested.

### **Patentability of the Claims – 35 USC §103(a)**

#### **Independent Claim 8**

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 5,577,502 by Darrow et al. (hereinafter referred to as “*Darrow*”) in view of US Patent No. 5,997,883 to Epstein (hereinafter referred to as “*Epstein*”).

Applicant respectfully submits that claim 8, as amended, is not obvious with respect to *Darrow* in view of *Epstein* because neither *Darrow* or *Epstein* alone or in combination, teach or suggest spatially registering a representation of the probe with the interpolated or extrapolated image, and simultaneously displaying the interpolated or extrapolated image and the representation of a probe, the interpolated or extrapolated image and representation of probe registered to substantially the same point in the bodily cycle, wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring time that corresponds to the point of the bodily cycle and using the location of the probe to display the representation of the probe at the recurring point in the bodily cycle. *Emphasis added.*

In the present action, the Examiner relies on *Darrow* as teaching simultaneously displaying an image and a representation of a probe, the image and representation of probe registered to substantially the same point in the bodily cycle. Claim 1 has been amended to further recite that wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring time that corresponds to the point of the bodily cycle and using the location of the probe to display the representation of the probe at the recurring point in the bodily cycle. Applicant respectfully submits that *Darrow* does not teach the above-recited steps.

While *Darrow* does describe simultaneously displaying an image with a representation of probe, *Darrow* does not teach that wherein registering a representation

of the probe comprises acquiring multiple locations of the probe at a recurring time that corresponds to the point of the bodily cycle and using the location of the probe to display the representation of the probe at the recurring point in the bodily cycle.

Rather, Darrow teaches two methods for correcting registration of images of a subject having a periodic cycle, neither of which teach the above-recited step. The first method described in col. 5, lines 1-10, describes locating a probe on an image by detecting expansion (e.g., from breathing) in the subject and inserting a graphic onto a screen so that an operator can see the expansion. For example, *Darrow* describes that, to track a device (e.g., probe) during a periodic motion cycle of subject such as a cardiac cycle, detected expansion of subject 100 can be used to dynamically stretch a single diagnostic image so that physician 1 views a scene which closely approximates the actual dynamics of subject 100. *Darrow* then teaches superposition of a graphic symbol synthesized by either device tracking unit 170, or registration unit 160, upon the dynamically changing diagnostic image. Nowhere in this embodiment does *Darrow* teach or describe wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring point in the bodily cycle and using the multiple locations of the probe to display the representation of the probe at the recurring point in the bodily cycle. In fact, in this embodiment *Darrow* does not mention any specific time that locations of the probe are acquired, and particularly not at a recurring point in the bodily cycle, as recited in claim 1.

In the second method *Darrow* teaches acquiring a series of images at different times within the cardiac cycle as measured by an electrocardiogram (ECG) signal. An ECG signal and the position of device 150 are measured at particular time. An image,

from the series of acquired images, which corresponds to the ECG signal acquired at that time, is selected as the reference image. This reference image is then translated and rotated to provide an updated image of subject 100 at that time. A representation of the measured location of device 150 at that time is then superimposed upon the updated image to result in an accurate registered image of subject 100 and device 150. However, *Darrow* does not describe that wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring time that corresponds to the point of the bodily cycle and using the location of the probe to display the representation of the probe at the recurring point in the bodily cycle. In fact, *Darrow* only describes acquiring an image at any time, not acquiring images at a recurring time in the bodily cycle. See col. 6, lines 14-49. Thus, in *Darrow*, the image and the probe registered to substantially the same point in the bodily cycle

*Epstein* does not cure the deficiencies of *Darrow*. *Epstein* describes a complete k-space data array is formed by selecting the appropriate k-space views from a raw data array. The calculated cardiac phase for the image is used to make this selection, and those k-space views with the same cardiac phase are selected from the raw data array to form the k-space data array. A k-space view may be calculated by linearly interpolating between the two acquired k-space views that straddle the desired cardiac phase. See col. 8, lines 34-42. However, *Epstein* does not teach or suggest wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring time that corresponds to the point of the bodily cycle and using the location of the probe to display the representation of the probe at the recurring point in the bodily cycle.

In view of the foregoing, withdrawal of the 35 U.S.C. §103(a) rejection of claim 8 is respectfully requested. In addition, Applicant submits that claims 10-14 are patentable by dependency.

#### Independent Claim 15

Claim 15 stands rejected under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 5,577,502 by Darrow et al. (hereinafter referred to as "*Darrow*") in view of US Patent No. 5,997,883 to Epstein (hereinafter referred to as "*Epstein*").

Applicant respectfully submits that claim 15 is not obvious over *Barrow* in view of *Epstein*, for the same reasons as claim 8, as claim 15 recites registering a representation of a probe which is inside the body with the interpolated or extrapolated image, the representation of the probe and the interpolated or extrapolated image being registered to the point in the bodily cycle, wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring point in the bodily cycle and using the multiple locations of the probe to display the representation of the probe at the recurring point in the bodily cycle.

In view of the foregoing, withdrawal of the 35 U.S.C. §103(a) rejection of claim 15 is respectfully requested. In addition, Applicant respectfully submits that claims 16-19 are patentable by dependency.

#### Dependent Claims 12 and 17

Claims 12 and 17 stands rejected under 35 USC §103(a) as being unpatentable over *Darrow* in view of *Epstein* in further view of US Patent 6,556,695 to Packer et al.

(hereinafter "*Packer*"). Applicant respectfully submits that claims 12 and 17 are patentable over *Darrow* in view of *Epstein* because claims 12 and 17 depends from claims 8 and 15, respectively, and for the reasons stated above, neither *Darrow* nor *Epstein*, alone or in combination, teach or suggest wherein registering a representation of a probe which is inside the body with the interpolated or extrapolated image, the representation of the probe and the interpolated or extrapolated image being registered to the point in the bodily cycle, wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring point in the bodily cycle and using the multiple locations of the probe to display the representation of the probe at the recurring point in the bodily cycle.

*Packer* does not cure the deficiencies of *Darrow* or *Epstein*. *Packer* describes producing a high resolution heart model that is registered with the acquired real-time images and used to produce high resolution images for display during a medical procedure. *Packer* also describes producing an electrical activation map which depicts the spatial distribution of heart wall electrical activation is merged with the anatomic images to facilitate cardiac ablation therapy. However *Packer* does not teach or suggest wherein registering a representation of the probe comprises acquiring multiple locations of the probe at a recurring point in the bodily cycle and using the multiple locations of the probe to display the representation of the probe at the recurring point in the bodily cycle.

In view of the foregoing, withdrawal of the 35 U.S.C. §103(a) rejection of claims 12 and 17 is respectfully requested.

### Conclusion

In view of the foregoing, Applicants respectfully submit that the application is in condition for allowance, and such action is respectfully requested.

It is believed that no fees or charges are required at this time in connection with the application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 09-0470.

Respectfully submitted,

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